UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte MASAMOTO UENISHI, KANJI YOSHIDA, NORIAKI FUKUSHIMA, HIROYUKI FUJIKI, KUNIO MISOO, NORITAKA SHIBATA

Appeal No. 2006-0382
Application No. 09/623,474

HEARD: February 23, 2006

Before CAROFF, WARREN, and OWENS, Administrative Patent Judges.

CAROFF, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims, 1, 3-8, and 11-17. Claims 9-10, the only other pending claims in appellants' application, stand withdrawn from consideration by virtue of the imposition of a restriction requirement by the examiner.

The claims on appeal are directed to a composite hollow fiber membrane having three or more layers. Appellants stipulate in their brief (page 3) that claims 1, 3-7, and 11-17 stand or fall together. Only claim 8 is separately argued.

Claim 1, the sole independent claim, is illustrative of appellants' invention and reads as follows:

1. A composite hollow fiber membrane comprising three or more layers of membrane comprising a three-dimensional net structure comprising a plurality of micropores comprising stacked lamella and micro fibrils connected with the stacked lamella, wherein

one or more dense layer(s), said dense layer(s) being thinner than an outermost layer and an innermost layer and said dense layer(s) comprising micropores of a mean pore diameter smaller than that of the micropores of the outermost layer and the innermost layer, is disposed as intermediate layer(s), between the outermost layer and the innermost layer, wherein the composite hollow fiber membrane has overall porosity of not less than 75% by volume, and wherein

the isothermal crystallization time τs of the resin used for the outermost layer and the innermost layer and the isothermal crystallization time τp of the resin used for the dense layer satisfy the following relationship:

$1 < \tau p/\tau s < 100$.

The examiner relies upon the following single prior art reference on appeal:[1]

Misoo et al (Misoo) EP 0 740 952 A1 Nov. 6, 1996

The following is the sole rejection before us for review:[2]

Claims 1, 3-8, and 11-17 stand rejected under 35 U.S.C. § 103(a) as being unpatentable in view of Misoo.

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[1] The examiner notes in his Supplemental Answer that, while the English abstract of a Japanese reference (3-169330) was relied upon in a prior Office action, that reference was inadvertently cited in the Examiner's Answer and is no longer being relied upon.

[2] As indicated in the brief (page 3), previous rejections under the first and second paragraphs of 35 U.S.C. §112 have been withdrawn by the examiner.

We have carefully evaluated the entire evidentiary record in light of the opposing positions taken by the appellants and the examiner on appeal. Having done so, we conclude that the examiner has established a prima facie case of obviousness which is not outweighed by the comparative evidence presented in appellants' specification. Accordingly, we shall affirm the rejection at issue.

The questions before us primarily relate to the porosity and isothermal crystallization time (ICT ratio) limitations, as recited in the claims, the comparative data presented in the specification, and the separate patentability of claim 8. Each of these issues will be addressed, seriatim, under separate headings.

The Porosity Limitation

Claim 1 requires that the composite membrane have an "overall porosity of not less than 75% by volume".

There is no dispute that Misoo discloses a composite membrane which can be composed of three layers, substantially as claimed, with the exception that there is no specific disclosure of an ICT ratio, and the only disclosure of porosity levels is with reference to specific examples (Table 1, page 13). The only exemplified three-layer membrane (Example 3) is shown to have a porosity of only 64%. The only exemplified membranes in Table 1 which have porosities of 75% or greater happen to be two-layer membranes. Also, as noted by the appellants, Misoo does not teach any advantage in

having the overall porosity be 75% or greater. In comparison, appellants' specification (page 20) indicates that such relatively high porosity values will extend filtration life.

Being mindful of the foregoing, we nevertheless find that the exemplified porosity values in Table 1 of Misoo are suggestive of a suitable porosity range for any membrane within the scope of the Misoo disclosure. Accordingly, we find that a person of ordinary skill in the art, after perusal of the entire Misoo disclosure, would have entertained a reasonable expectation that the overall porosity of a three-layer membrane desirably should be within the range established by examples 1-10 in Table 1.

Thus, any three-layer composite hollow fiber membrane having a porosity within the range established by example in Misoo would have been prima facie obvious, within the purview of 35 U.S.C. §103, absent a showing of any new or unexpected results for overall porosities of 75% or greater.

The ICT Ratio Limitation

With regard to this issue, the examiner points out that Misoo teaches (see page 4, lines 40-56) that the MI (melt index) of the resin used for each layer should be chosen such that MIb>MIa. The examiner also states on page 5 of his answer that the "melt index, which is a measure of the mobility of the polymer chains", "inherently effects chain mobility dependent isothermal crystallization time". In other words, the examiner has made a finding that there is a direct correlation between melt index and isothermal crystallization time, from which it can be reasonably inferred that values within the claimed

ICT ratio range are inherent in the MI requirements set forth in Misoo. This finding has not been rebutted by the appellant. Accordingly, the examiner's finding is dispositive of the issue. Selection of an ICT ratio within the claimed range either would have been inherent in the choice of a suitable MI ratio, as taught by Misoo, or an obvious matter of routine optimization of the MI ratio, within the context of 35 U.S.C. § 103.

The Comparative Data in the Specification

The data presented in appellants' specification is said to demonstrate superior results for three-layer composite membranes having overall porosities within the range of claim 1 (Examples 1-5) when compared to two-layer composite membranes having overall porosities just outside the range of claim 1 (Comparative Examples 1 and 2). The results are presented in appellants' Table 2.

In response, the examiner aptly notes that appellants' data is not persuasive since: (a) the comparative two-layer membranes have lower porosities than those exemplified two-layer membranes of Misoo which have porosities of 75% or more; and (b) there is no comparative example of a three-layer membrane as in Misoo example 3. In essence, the examiner argues, and we agree, that appellant's data does not represent an objective and meaningful comparison with the closest prior art, i.e. Misoo.

In their reply brief, appellants attempt to make a one-to-one comparison between the three-layer membranes of their Examples 4 and 5 and the three-layer membrane exemplified in Misoo on the basis of a similarity in layer thicknesses. Appellants then

conclude that the observed differences in porosity can be attributed to differences in the ICT ratio for the resins used in the respective membranes.

However, appellants' analysis fails to take into account differences in other physical properties and process parameters as between appellants' Examples 4 and 5, and Misoo example 3, e.g. resin density, melt index, extrusion conditions, annealing temperature, stretching conditions, etc. Thus, the cause and effect sought to be proven is lost in the welter of unfixed variables. Cf. In re Dunn, 349 F.2d 433, 439, 146 USPQ 479, 483 (CCPA 1965); In re Heyna, 360 F.2d 222, 228, 149 USPQ 692, 697 (CCPA 1966).

Claim 8

With respect to claim 8, the examiner has made a specific finding that the disclosure in Misoo of a water permeability of "preferably not less than 5 l/m^2.hr. mmHg" is equivalent to a water permeability of greater than 37.5 L/(m^2 x hr x KPa); which is clearly greater than the amount recited in claim 8. Moreover, the examiner apparently draws the logical inference that an "initial" water permeation rate equal to or greater than the amount recited in claim 8 would inherently follow from the degree of water permeability disclosed by Misoo or, at least, would result from routine optimization of membrane water permeability, within the purview of 35 U.S.C. §103.

Appellants' mere assertion that Misoo does not teach or suggest any specific "initial" water permeation rate is insufficient to rebut the examiner's finding and the

reasonable inference drawn from that finding. Accordingly, we hold that the limitation recited in claim 8 does not constitute a basis for patentability.

For all of the foregoing reasons, the decision of the examiner is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED

MARC L. CAROFF
Administrative Patent Judge

CHARLES F. WARREN
Administrative Patent Judge

TERRY J. OWENS
Administrative Patent Judge

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